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6 January 2000

Ms. Janet Steward
Town of Plainfield
P.O. Box 217
Plainfield, VT 05667

Re: *Initial Site Investigation Report*
Plainfield Town Garage, Plainfield, VT

Dear Ms. Steward:

Enclosed is a final copy of the *Initial Site Investigation Report* for the Plainfield Town Garage, located on Cameron Road in Plainfield, Vermont. The report has also been submitted to Mr. Chuck Schwer at the VT DEC.

Should you have any questions or concerns regarding this report or any other project matter, please do not hesitate to contact me at (800) 520-6065.

Sincerely,

Marin Environmental, Inc.

Michael Laurent
Environmental Engineer

Enclosure

cc: Mr. Chuck Schwer, VT DEC
Mr. Alan D. Farnham, Plainfield Road Foreman

Ref: 990036L02.doc

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JAN 0 7 2000

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PLAINFIELD TOWN GARAGE
CAMERON ROAD
PLAINFIELD, VERMONT

6 JANUARY 2000

INITIAL SITE INVESTIGATION REPORT

SMS # 99-2639

Prepared for:

TOWN OF PLAINFIELD
Plainfield, Vermont

Prepared by:

MARIN
ENVIRONMENTAL, INC.
Colchester, Vermont

Reference No. VT99-0036

INITIAL SITE INVESTIGATION REPORT

PLAINFIELD TOWN GARAGE
Plainfield, Vermont

6 January 2000

Prepared for:

Town of Plainfield
P.O. Box 217
Plainfield, Vermont

Contact: Allan D. Farnham
Phone: (802) 454-8461

Prepared by:

Marin Environmental, Inc.
1700 Hegeman Avenue
Colchester, VT 05446

Contact: Michael Laurent
Phone: 802-655-0011

Marin Project # VT99-0036
Document # 980036isi.doc

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EXECUTIVE SUMMARY

Marin Environmental, Inc. (Marin) has conducted an initial site investigation at the Plainfield Town Garage, located on Cameron Road in Plainfield, Vermont. The investigation included the installation of five monitoring wells, ground-water sampling and analysis of the five newly installed monitoring wells, and an evaluation of potential threats to nearby receptors. Marin's findings related to this work are summarized as follows:

- Subsurface petroleum contamination was discovered on 28 May 1999 during the removal of a 2,000-gallon diesel underground storage tank (UST), a 1,000-gallon gasoline UST, and a 275-gallon fuel-oil UST. Photoionization detector (PID) readings from soils within the diesel UST excavation ranged from 1.6 to 506 parts per million (ppm). PID readings on soils within the gasoline-UST excavation ranged from 0.0 to 231 ppm. PID readings on soils within the fuel-oil UST excavation ranged from 0.0 to 25.6 ppm. The highest PID readings in each excavation were observed on soils immediately beneath the base of the UST at approximately 5.0 to 6.0 feet below ground surface (bgs).

- Analytical results from sampling performed on 7 October 1999 indicate that the shallow aquifer in the vicinity of the former diesel and gasoline USTs is contaminated with dissolved-phase, petroleum-related organic compounds. None of the Vermont Groundwater Enforcement Standards (VGESs) were exceeded in the ground-water samples collected from the five on-site monitoring wells. However, total petroleum hydrocarbons (TPH), which do not have established regulatory limits in Vermont, were detected in MW-1 at 1.60 milligrams per liter. The presence of TPH is an indicator of the possible presence of Polycyclic Aromatic Hydrocarbons (PAHs), several of which are regulated.

- The lateral extent of dissolved-phase contamination appears to be primarily limited to the immediate vicinity of both the former diesel UST and former gasoline UST area. Total volatile organic compound (VOC) concentrations were detected exclusively in monitoring well MW-1, located in the vicinity of the former diesel and gasoline USTs, at 13.1 micrograms per liter (µg/L). Methyl Tertiary-Butyl Ether (MTBE), an octane-enhancing gasoline additive, was detected in monitoring wells MW-4 and MW-5 at 2.4 µg/L and 1.5 µg/L respectively. No VOCs were detected in MW-3 or MW-2 which is located within the former fuel-oil UST excavation.

- No sensitive receptors appear to currently be at risk from the petroleum release that occurred on-site.

EXECUTIVE SUMMARY

- In general, dense to very dense, gray silts and sands were encountered beneath the site to approximately fifteen feet bgs, underlain by a till unit. The thickness of the till unit and the depth to bedrock were not determined. During the boring program, ground water was encountered approximately nine to ten feet bgs.
- Based on the limited hydrogeologic data collected at the site to date, ground water in the unconfined surficial aquifer at the site appears to flow in a southwesterly direction toward the Great Brook, with an average horizontal hydraulic gradient of approximately four percent.

Based on all the data collected at the site to date, Marin recommends the following:

1. Ground-water quality in monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-5 should be monitored again in the spring during high seasonal groundwater levels to evaluate whether contaminant concentrations are decreasing and to confirm that contaminants are not migrating from the former UST areas. Ground-water samples should be analyzed for volatile petroleum compounds by EPA Method 8021B.
2. Because TPH was detected at MW-1, the supplemental monitoring event at this location should include laboratory analysis of Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270 to determine if PAHs are detected at concentrations above enforcement standards.
3. The garage should be visually inspected and screened for the possible presence of VOCs with a PID during the supplemental site visit.
4. The stream / wetland should again be visually inspected for the possible presence of seeps or evidence of petroleum contamination during the supplemental site visit.
5. Upon completion of supplemental activities, a report should be prepared, which summarizes the monitoring event results and provides recommendations for site closure or, if necessary, further site monitoring.

1.0 INTRODUCTION

This report details the results of an Initial Site Investigation performed by Marin Environmental, Inc. (Marin) at the Plainfield Town Garage, located on Cameron Road in Plainfield, Vermont (Figures 1 and 2, Appendix A). This report has been prepared by Marin on behalf of the Town of Plainfield, owner of the former on-site underground storage tanks (USTs). The investigation was conducted in accordance with the Vermont Department of Environmental Conservation (VT DEC) Expressway process following the discovery of subsurface petroleum contamination during the removal of three abandoned USTs on 28 May 1999.

1.1 Site Description and Physical Setting

The site is located on Cameron Road, in Plainfield, Vermont, approximately one mile southeast of Vermont Route 2 (Figure 1, Appendix A). A 5,000 square-foot slab-on-grade garage is the only structure present on the property. The remainder of the property consists of road sand / salt storage piles, and gravel parking areas. Municipal water service the site along the eastern property line. The property has its own private sewer system located on the west side of the garage. The Great Brook is located approximately 1000 feet southwest (downgradient) of the former USTs. The site is bounded by Cameron Road to the south, a wooded area to the west, and open pastures to the north and east.

The former diesel and gasoline USTs were located at the front (south side) of the building approximately 75 feet north of Cameron Road (Figure 2, Appendix A).

1.2 Site History

On 28 May 1999, subsurface petroleum contamination was discovered at the property during the removal of three underground storage tanks (USTs) and associated piping systems.

Photoionization detector (PID) readings from soils within the diesel UST excavation ranged from 1.6 to 506 parts per million (ppm). PID readings on soils within the gasoline-UST excavation ranged from 0.0 to 231 ppm. PID readings on soils within the fuel-oil UST excavation ranged from 0.0 to 25.6 ppm. The highest PID readings in each excavation were observed on soils immediately beneath the base of the UST at approximately 5.0 to 6.0 feet below ground surface (bgs). Ground water was also observed at approximately nine to ten feet bgs. The extent of subsurface contamination was not determined during the UST closures, so all soils from the excavation were backfilled.

1.3 Objectives and Scope of Work

The objectives of this initial site investigation were to:

- evaluate the degree and extent of petroleum contamination in soil and ground water;
- qualitatively assess the risks to environmental and public health via relevant sensitive receptors and potential contaminant migration pathways; and
- identify potentially appropriate monitoring and/or remedial actions based on the site conditions.

To accomplish these objectives, Marin has:

- supervised the advancement of five soil borings, and the subsequent installation of five water-table monitoring wells in the borings;
- screened subsurface soils from the soil borings for the possible presence of volatile organic compounds (VOCs) using a PID;
- collected and submitted ground-water samples from the two monitoring wells for laboratory analysis of volatile petroleum compounds by EPA Method 8021B and total petroleum hydrocarbons (TPH) by EPA Method 8015 (Diesel Range Organics);
- identified sensitive receptors in the area, and assessed the risks posed by the contamination to these potential receptors;
- prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions, and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

2.1 Soil Boring / Monitoring Well Installation

On 2 August 1999, Marin supervised the completion of five soil borings/monitoring wells (MW-1 through MW-5) to initially characterize contaminant and hydrogeologic conditions at the site (Figure 2, Appendix A).

Monitoring well MW-1 was installed in the immediate vicinity of both the former diesel UST and the former gasoline UST. Monitoring well MW-2 was installed in the immediate vicinity of the former fuel-oil UST. Monitoring well MW-3 was installed in the presumed downgradient direction of the former fuel-oil UST. Monitoring wells MW-

4 and MW-5 were installed in the presumed downgradient direction of the both the former diesel UST and former gasoline UST.

In general, dense to very dense, gray silts and sands were encountered beneath the site to approximately fifteen feet bgs, underlain by a hardpan unit. The thickness of the hardpan unit and the depth to bedrock were not determined. During the boring program, ground water was encountered approximately nine to ten feet bgs.

The soil borings were advanced by M&W Soils Engineering, Inc. (Charlestown, New Hampshire) using hollow-stem-auger (HSA) drilling methods. Soil samples were collected at five-foot intervals from each boring using a standard split-spoon barrel. Sample recovery was good to very good, ranging from 50 to 80 percent. The samples obtained were screened for the possible presence of VOCs with a PE PhotoVac Model 2020 photoionization detector (PID), and logged for lithology by a Marin engineer. All downhole drilling and sampling equipment was decontaminated during use as appropriate.

Monitoring wells MW-1 through MW-5 were constructed with two-inch-diameter schedule 40 poly-vinyl chloride (PVC) with flush threaded joints. Well screens consisted of 0.010-inch factory-slotted, five-foot screen sections. The tops of the screen sections were set anywhere from 3.6 to 5.6 feet above the ground-water level. Sections of solid PVC were added to bring the tops of the well casings to approximately 0.5 feet bgs. Clean silica #1 filter sand was placed in the borehole annulus around each well to nominally one foot above the slotted interval. A granular bentonite seal, approximately one foot thick, was set above the sand pack and the remainder of the annular space was backfilled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a watertight expansion cap. Soil-boring and monitoring-well construction logs are included in Appendix B.

To remove fine-grained sediment, the monitoring wells were developed immediately after installation using a peristaltic pump. None of the monitoring wells contained free-phase product during development, and development water was discharged directly to the ground surface in the vicinity of each well. On 7 October 1999, the five newly installed monitoring wells were surveyed relative to existing site features, with an azimuth accuracy of (+/-) 1.0 feet, and an elevation accuracy of (+/-) 0.01 feet.

2.2 Soil-Screening Results

During the soil-boring program on 2 August 1999, split-spoon soil samples were collected at five-foot intervals in each boring for subsequent headspace screening with a PID. Elevated PID readings were measured on soil samples collected at both soil boring locations.

The highest PID reading (25.5 ppm) was recorded from a soil sample collected approximately five to seven feet bgs in MW-1. Elevated PID readings were observed throughout the soil column at this location, with a PID reading of 5.2 ppm detected in the base of the boring at approximately 12.6 feet bgs.

PID readings in MW-2, MW-3, MW-4, and MW-5 were 0.0 ppm throughout each borings to a depth of 15.6 feet bgs.

A Marin engineer screened soil samples from each soil boring for the possible presence of volatile organic compounds (VOCs) using a PhotoVac Model 2020 portable photoionization detector (PID). The PID was calibrated in the field with an isobutylene standard gas to a benzene reference. PID screening results are included on the boring logs in Appendix B.

2.3 Ground-Water Elevation Calculations and Flow Direction

Based on the limited hydrogeologic data collected at the site to date, ground water in the unconfined surficial aquifer at the site appears to flow in a southwesterly direction toward Great Brook, with an average horizontal hydraulic gradient of approximately four percent.

Water levels were measured in the newly installed monitoring wells located at the Plainfield Town Garage on 7 October 1999. Depths to water ranged from 2.51 feet (MW-5) to 5.56 feet (MW-3) below top-of-casing. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet. Water-level measurements and elevation calculations for 7 October 1999 are presented in Table 1 (Appendix A). Figure 3 is the water-table contour map prepared using this data (Appendix A).

2.4 Sampling and Analysis

The 7 October 1999 analytical results indicate that the shallow aquifer beneath the site is contaminated with dissolved-phase petroleum-related VOCs. The lateral extent of

dissolved-phase contamination appears to be limited within the immediate vicinity of the former diesel and gasoline UST. Given the available hydrogeologic and contaminant-distribution data, it appears that the petroleum contamination detected on-site may be attributed to both the former diesel and former gasoline UST systems. Analytical results are included in Table 2, and on the Contaminant-Distribution Map (Appendix A). Laboratory report forms are included in Appendix C.

Analytical results from sampling performed on 7 October 1999 indicate that the shallow aquifer in the vicinity of both the former diesel UST and former gasoline UST is contaminated with dissolved-phase, petroleum-related organic compounds. None of the Vermont Groundwater Enforcement Standards (VGESs)[1] were exceeded in the groundwater samples collected from the five on-site monitoring wells. However, total petroleum hydrocarbons (TPH), which do not have established regulatory limits in Vermont, were detected in MW-1 at 1.60 milligrams per liter. The presence of TPH is an indicator of the possible presence of Polycyclic Aromatic Hydrocarbons (PAHs), several of which are regulated.

The lateral extent of dissolved-phase contamination appears to be primarily limited to the immediate vicinity of both the former diesel UST and former gasoline UST area. Total volatile organic compound (VOC) concentrations were detected exclusively in monitoring well MW-1, located in the vicinity of the former diesel and gasoline USTs, at 13.1 micrograms per liter (µg/L). Methyl Tertiary-Butyl Ether (MTBE), an octane-enhancing gasoline additive, was detected in monitoring wells MW-4 and MW-5 at 2.4 µg/L and 1.5 µg/L respectively. No VOCs were detected in MW-3 or MW-2 which is located within the former fuel-oil UST excavation.

Water-quality samples were collected on 7 October 1999 from the five newly installed monitoring wells (MW-1 through MW-5). Monitoring wells were purged and then sampled using dedicated bailers and dropline. Purge water was discharged directly to the ground in the vicinity of each well. Trip blank and duplicate samples were collected to ensure that adequate quality assurance/quality control (QA/QC) standards were maintained. All field procedures were conducted in accordance with Marin standard protocols.

[1] The Vermont DEC has established Groundwater Enforcement Standards (VGESs) for eight petroleum related VOCs, as follows: benzene – 5 µg/L; toluene – 1,000 µg/L; ethylbenzene – 700 µg/L; xylenes – 10,000 µg/L; MTBE, a gasoline additive, – 40 µg/L; naphthalene – 20 µg/L; 1,2,4-trimethyl benzene – 5 µg/L; and 1,3,5-trimethyl benzene – 4 µg/L.

All samples were transported under chain-of-custody in an ice-filled cooler to Endyne, Inc. of Williston, Vermont. All of the groundwater samples collected were submitted for laboratory analysis of VOCs by EPA Method 8021B and of total petroleum hydrocarbons (TPH) by EPA Method 8015 (Diesel Range Organics).

Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. None of the VOCs were detected in the trip blank. Analytical results for the duplicate sample collected from MW-1 were within twenty-five percent of the original sample results.

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

3.1 Sensitive Receptor Survey

Marin conducted a survey to identify sensitive receptors in the vicinity of the Plainfield Town Garage that could potentially be impacted by contamination associated with the site. The following sensitive receptors were identified in the vicinity of the site:

- A stream / wetland area located adjacent to the western property line to the southeast of the former USTs;
- Great Brook, a tributary of the Winooski River, located 1,000 feet south (downgradient) of the former USTs;
- indoor air-quality in the on-site building, and in the basements of off-site buildings, located adjacent to former USTs; and
- municipal water underground utilities present on the site.

3.2 Risk Assessment

Marin assessed the risks that the residual soil and dissolved-phase subsurface contamination poses to the receptors identified above. In general, human exposure to petroleum related contamination is possible through inhalation, ingestion, or direct contact while impacts to environmental receptors are due either to a direct release or contaminant migration through one receptor to another or along a preferential pathway.

The results of our risk assessment are as follows:

- No visual or olfactory evidence of petroleum contamination was observed in the stream / wetland area during the 7 October sampling event.

- Based on the absence of petroleum-related contaminants in the downgradient monitoring wells, with the exception of MTBE, Great Brook does not appear to be at risk.

- The indoor air of the on-site building does not appear to be at high risk from petroleum vapor contamination. PID levels within the garage were non-detect during an inspection on 7 October 1999. Additionally, the building does not have a basement, which could facilitate indoor migration of contaminant vapors from the subsurface.

- The municipal water underground utilities at the site do not appear to be at risk for petroleum vapor accumulation based on the distance from contaminants identified on-site.

4.0 CONCLUSIONS

Based on the results of the site investigation described above, Marin concludes the following:

- Subsurface petroleum contamination was discovered on 28 May 1999 during the removal of a 2,000-gallon diesel underground storage tank (UST), a 1,000-gallon gasoline UST, and a 275-gallon fuel-oil UST. Photoionization detector (PID) readings from soils within the diesel UST excavation ranged from 1.6 to 506 parts per million (ppm). PID readings on soils within the gasoline-UST excavation ranged from 0.0 to 231 ppm. PID readings on soils within the fuel-oil UST excavation ranged from 0.0 to 25.6 ppm. The highest PID readings in each excavation were observed on soils immediately beneath the base of the UST at approximately 5.0 to 6.0 feet below ground surface (bgs).

- Analytical results from sampling performed on 7 October 1999 indicate that the shallow aquifer in the vicinity of the former diesel and gasoline USTs is contaminated with dissolved-phase, petroleum-related organic compounds. None of the Vermont Groundwater Enforcement Standards (VGESs) were exceeded in the ground-water samples collected from the five on-site monitoring wells. However, total petroleum hydrocarbons (TPH), which do not have established regulatory limits in Vermont, were detected in MW-1 at 1.60 milligrams per liter. The presence of TPH is an indicator of the possible presence of Polycyclic Aromatic Hydrocarbons (PAHs), several of which are regulated.

- The lateral extent of dissolved-phase contamination appears to be primarily limited to the immediate vicinity of both the former diesel UST and former gasoline UST area. Total volatile organic compound (VOC) concentrations were detected exclusively in monitoring well MW-1, located in the vicinity of the former diesel and gasoline USTs, at 13.1 micrograms per liter (µg/L). Methyl Tertiary-Butyl Ether (MTBE), an octane-enhancing gasoline additive, was detected in monitoring wells MW-4 and MW-5 at 2.4 µg/L and 1.5 µg/L respectively. No VOCs were detected in MW-3 or MW-2 which is located within the former fuel-oil UST excavation.

- No sensitive receptors appear to currently be at risk from the petroleum release that occurred on-site.

- In general, dense to very dense, gray silts and sands were encountered beneath the site to approximately fifteen feet bgs, underlain by a till unit. The thickness of the till unit and the depth to bedrock were not determined. During the boring program, ground water was encountered approximately nine to ten feet bgs.

- Based on the limited hydrogeologic data collected at the site to date, ground water in the unconfined surficial aquifer at the site appears to flow in a southwesterly direction toward the Great Brook, with an average horizontal hydraulic gradient of approximately four percent.

5.0 RECOMMENDATIONS

On the basis of the results of this investigation and the conclusions stated above, Marin recommends the following:

1. Ground-water quality in monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-5 should be monitored again in the spring during high seasonal groundwater levels to evaluate whether contaminant concentrations are decreasing and to confirm that contaminants are not migrating from the former UST areas. Ground-water samples should be analyzed for volatile petroleum compounds by EPA Method 8021B.

2. Because TPH was detected at MW-1, the supplemental monitoring event at this location should include laboratory analysis of Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270 to determine if PAHs are detected at concentrations above enforcement standards.

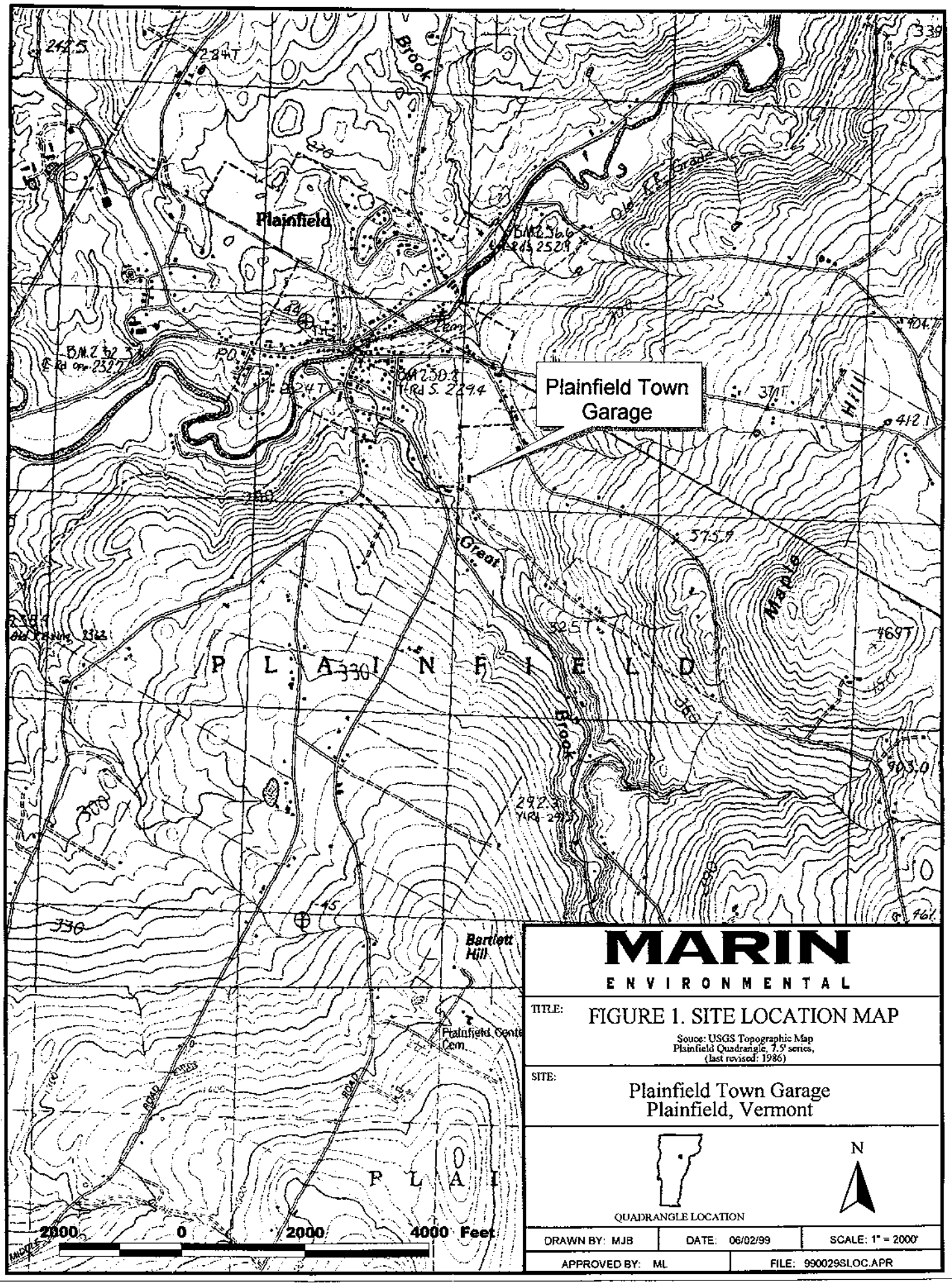
3. The garage should be visually inspected and screened for the possible presence of VOCs with a PID during the supplemental site visit.

4. The stream / wetland should again be visually inspected for the possible presence of seeps or evidence of petroleum contamination during the supplemental site visit.

5. Upon completion of supplemental activities, a report should be prepared, which summarizes the monitoring event results and provides recommendations for site closure or, if necessary, further site monitoring.

APPENDIX A

Figures and Tables



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TITLE: FIGURE 1. SITE LOCATION MAP

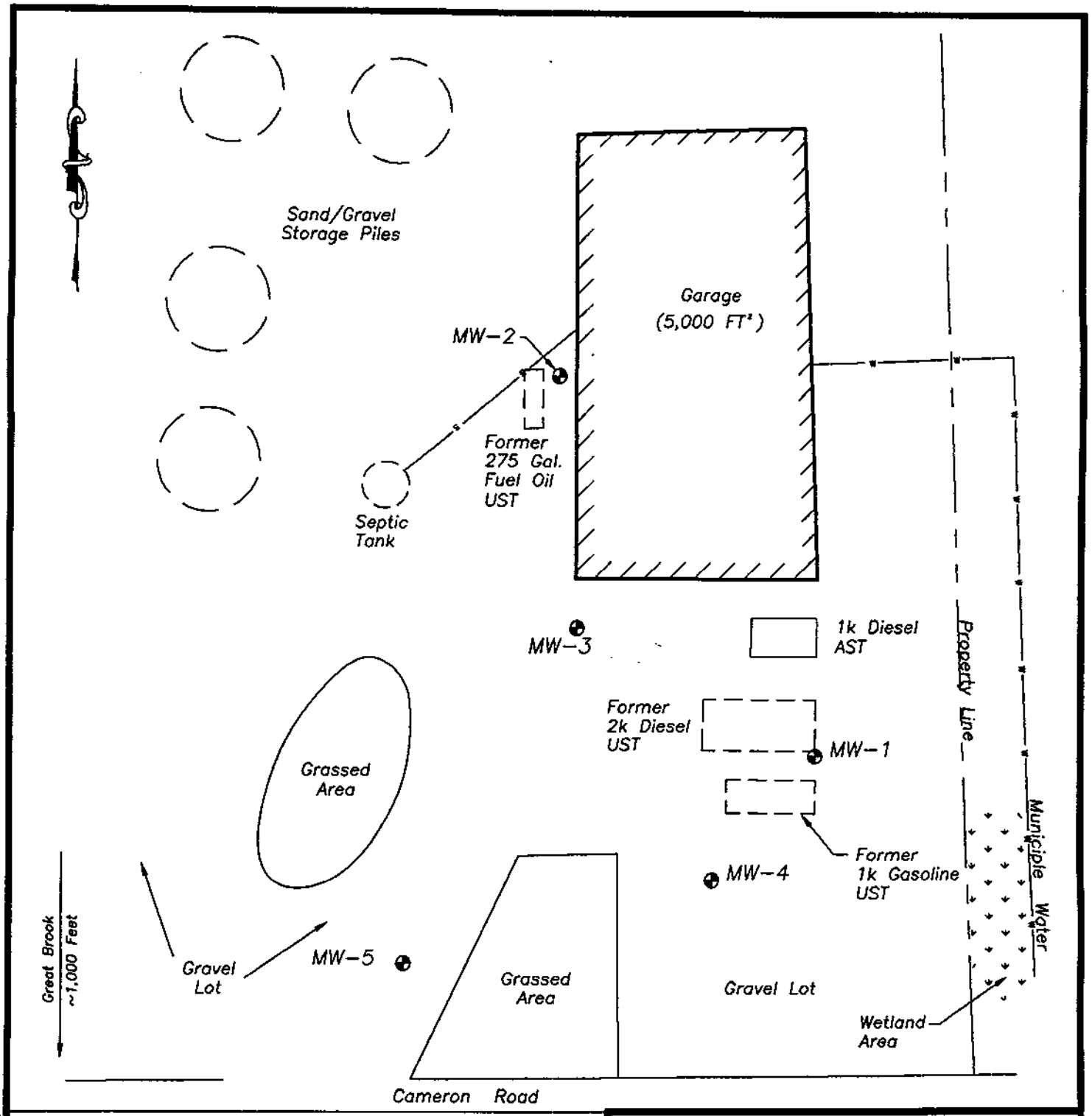
Souce: USGS Topographic Map
Plainfield Quadrangle, 7.5' series,
(last revised: 1986)

SITE:
Plainfield Town Garage
Plainfield, Vermont

QUADRANGLE LOCATION

N

DRAWN BY: MJB	DATE: 06/02/99	SCALE: 1" = 2000'
APPROVED BY: ML		FILE: 990029SLOC.APR



LEGEND

MW-2 ⊕ MONITORING WELL

0 30

ALL LOCATIONS ARE APPROXIMATE

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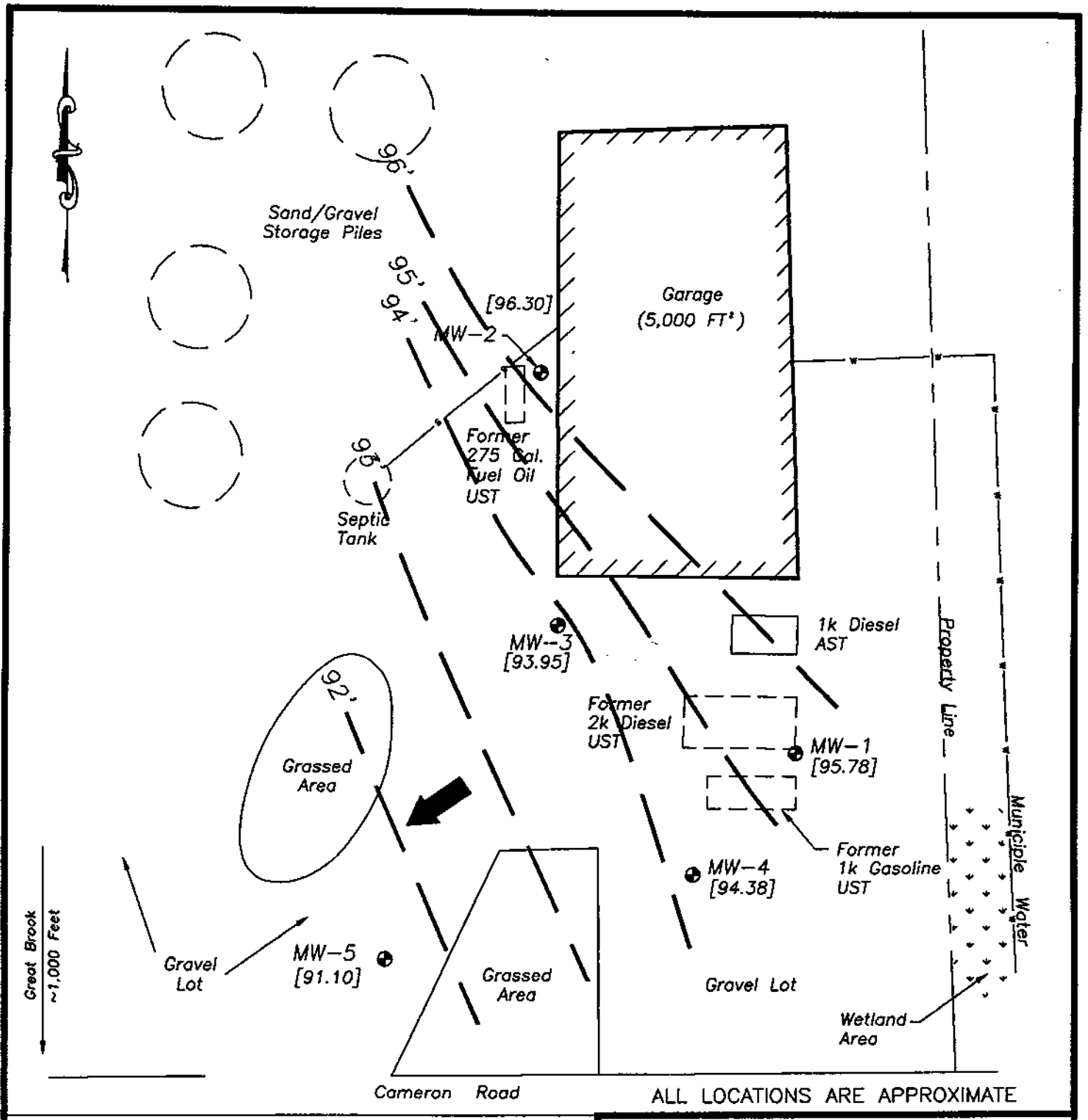
FIGURE 2.
SITE PLAN
WITH MONITORING WELL LOCATIONS

Plainfield Town Garage
Plainfield, VT

DRAWN BY: MJB	DATE: 10/14/99	SCALE: 1"= 30'
APPROVED BY: ML	FILE No.: 990036sp	



LEGEND

MW-2 ⊕ MONITORING WELL
[91.10] GROUND WATER ELEVATION (FT.)
96' GROUND WATER ELEVATION CONTOUR (FT.)
INFERRED GROUND WATER FLOW DIRECTION

0 30

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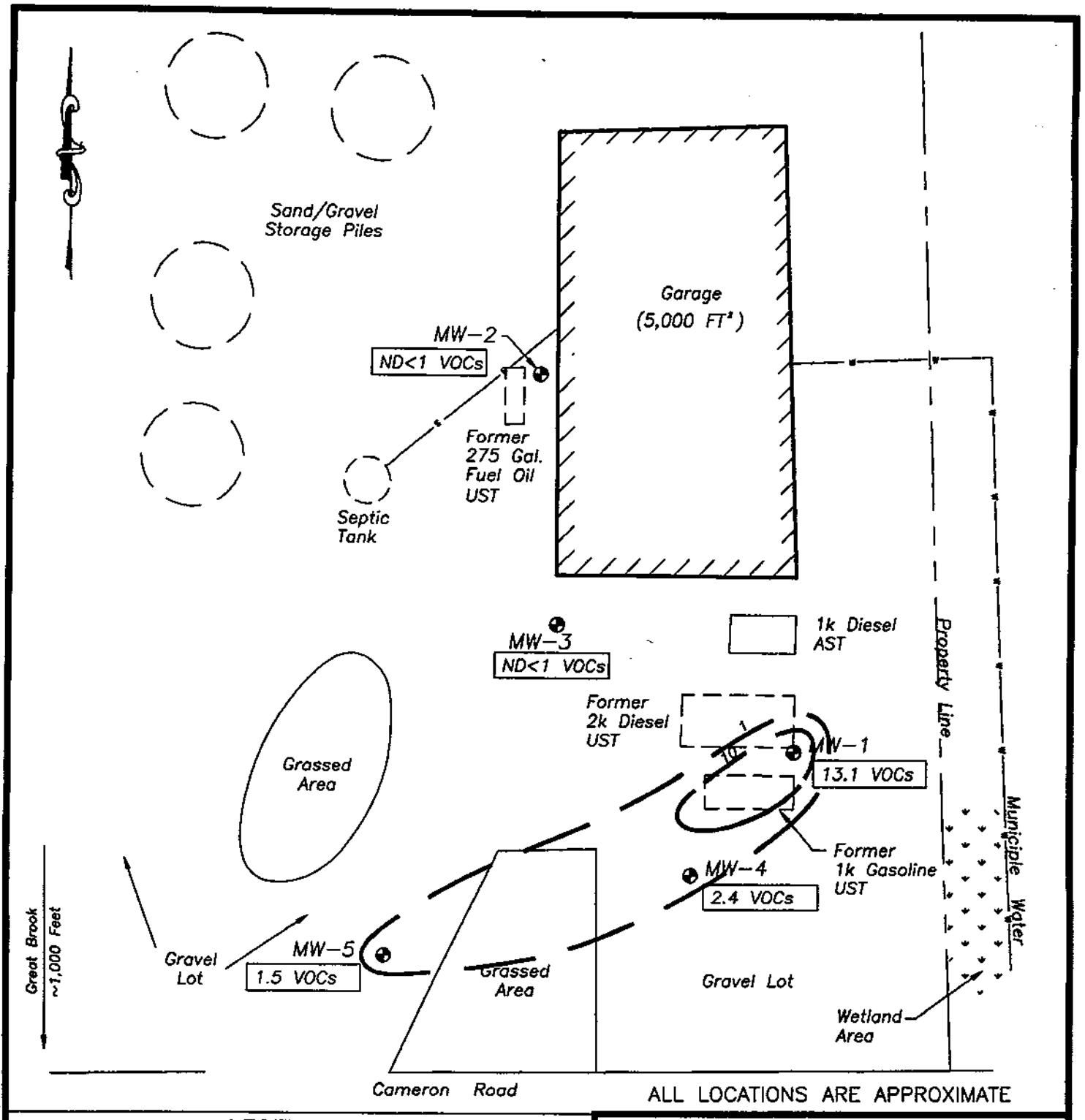
FIGURE 3.
GROUNDWATER CONTOUR MAP
Monitoring Date: 07 October 1999

Plainfield Town Garage
Plainfield, VT

DRAWN BY: MJB	DATE: 10/14/99	SCALE: 1"= 30'
APPROVED BY: ML		FILE No.: 990036sp



LEGEND

MW-2 ⊕	MONITORING WELL
10 ——	VOC CONTOUR, (µg/L)
VOCs	VOLATILE ORGANIC COMPOUNDS, (µg/L)
ND	NONE DETECTED

0 30

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FIGURE 4.
CONTAMINANT DISTRIBUTION MAP
Monitoring Date: 07 October 1999

PLAINFIELD TOWN GARAGE
PLAINFIELD, VT

DRAWN BY: MJB	DATE: 10/14/99	SCALE: 1"= 30'
APPROVED BY: XX	FILE No.: 990036sp	

TABLE 1
GROUND-WATER ELEVATION CALCULATIONS

Plainfield Town Garage
Plainfield, Vermont

Monitoring Date: 7 October 1999

Well I.D.	Depth to Bottom	Top of Casing Elevation	Depth to Water	Water Table Elevation
MW-1	12.16	99.19	3.41	95.78
MW-2	14.95	100.00	3.70	96.30
MW-3	14.82	99.51	5.56	93.95
MW-4	15.05	99.21	4.83	94.38
MW-5	15.00	93.61	2.51	91.10

All values reported in feet relative to arbitrary site datum of 100.00 feet.

TABLE 2
LABORATORY ANALYTICAL RESULTS
(Volatile Organic Compounds)

Plainfield Town Garage
Plainfield, VT

Monitoring Date: 7 October 1999

Sample Location	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	1,3,5 TMB	1,2,4 TMB	Naphthalene	Total VOCs	UIP	TPH
Ground Water											
MW-1	5.1	2.7	ND <1	ND <1	TBQ<1	TBQ<1	1.9	3.4	13.1	>10	1.6
MW-2	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND	0	ND <0.4
MW-3	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND	0	ND <0.4
MW-4	2.4	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND	0	ND <0.4
MW-5	1.6	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND	0	ND <0.4
VGES	***40***	***5***	***1,000***	***700***	***10,000***	***4***	***5***	***20***	--	--	--
QA/QC											
MW-1	5.1	2.7	ND <1	ND <1	TBQ<1	TBQ<1	1.9	3.4	13.1	>10	1.6
Duplicate (MW-1)	5.4	2.6	ND <1	ND <1	TBQ<1	TBQ<1	1.8	2.5	12.3	>10	NS
Trip Blank	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1	ND	0.0	NS
VGES	***40***	***5***	***1,000***	***700***	***10,000***	***4***	***5***	***20***	--	--	--

Notes: All concentrations reported in ug/L, except TPH which is in mg/l
NS = Not sampled for this parameter
ND = None Detected above quantitation limit
UIP = Unidentified peaks via EPA Method 8021B
VOCs analyzed by EPA Method 8021B
TPH analyzed by EPA Method 8015 (for Diesel Range Organics)
VGES = Vermont Groundwater Enforcement Standard

APPENDIX B

Boring Logs /Monitoring Well Construction Diagrams

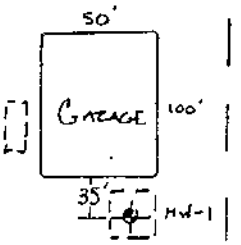
Marin Environmental, Inc.

SITE NAME: PLAINFIELD TOWN GARAGE
LOCATION: PLAINFIELD, VT
JOB NO. VT990036
DATE: 9-2-99

BORING NO: MW-1
TOTAL DEPTH: 12'8"
DEPTH TO WATER: 9'-10'

DRILLING METHOD HSA
BORING DIAMETER 4 1/4" HSA

FIELD SUPERVISOR: M LAURENT
CONTRACTOR: H;W SOILS ENG. CHARLESTOWN, NH
DRILLERS: MH, WM & CC



Boring/Well Location

Depth (ft)	Sample No.	BLOW COUNTS PER 6" 0-6	6-12	12-18	18-24	Rec. (ft)	SAMPLE DESCRIPTION	STRATA	WELL DETAIL	PID (ppm)
							MED. DENSE BROWN CRUSHED GRAVEL	3'		
5'	SS 1	4	3	5	6	15"	LOOSE - BROWN SANDY FILL	8'+/-		25.5
10'	SS 2	9	17	24	27	17"	MED. DENSE - DENSE GREY GRAVELLY SILTS & SANDS W/ COBBLES	12'8"		5.2
15'							REFUSAL TO AUGER HARD PAN			
							SET 2" WELL @ 12'6"			
							TOP OF WELL @ 3'6"			
							SAND TO 2'4"			
20'							BENTONITE TO 1'10"			
25'										

AND	33-50%
SOME	20-33%
LITTLE	10-20%
TRACE	0-10%

BLOW COUNT	
0-4	VERY LOSE
4-10	LOOSE
10-30	MEDIUM
30-50	DENSE
>50	VERY DENSE

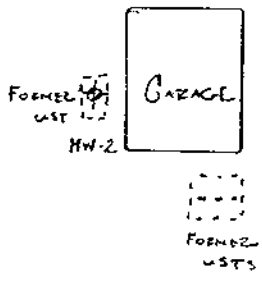
MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10"
SLOT SIZE	0.010"	
RISER	2" PVC	5'
GRADED SAND		275 #
BENTONITE PELLETS		15 #
BENTONITE GROUT		40 #

Marin Environmental, Inc.

SITE NAME: Plain Field Town Garage
LOCATION: Plainfield, VT
JOB NO. VT 990036
DATE: 1-2-99

BORING NO: MW-2
TOTAL DEPTH: 15'6"
DEPTH TO WATER: ~10'

DRILLING METHOD: HSA
FIELD SUPERVISOR: M. Laurent
BORING DIAMETER: 4 1/4 HSA
CONTRACTOR: M&W Soils Eng. Charlestown, NH
DRILLERS:



Depth (ft)	Sample No.	BLOW COUNTS PER 6" 0-6	6-12	12-18	18-24	Rec. (ft)	SAMPLE DESCRIPTION	STRATA	WELL DETAIL	PID (ppm)
5'	SS1	5	7	7	7	16"	LOOSE · BROWN SANDY FILL	7'		6.3
10'	SS2	20	27	24	38	17"	DENSE - VERY DENSE GREY GRAVELLY SILTS & SANDS			0.0
15'	SS3	63	100			12"		16'		0.0
20'							NO BEDROCK TO DEPTH SET 2" WELL @ 15'6" TOP OF WELL @ 5'6" SAND TO 4'1" BENTONITE TO 3'2"			
25'										

AND	35-50%
SOME	20-35%
LITTLE	10-20%
TRACE	0-10%

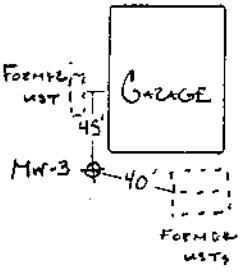
BLOW COUNT	
0 - 4	VERY LOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
> 50	VERY DENSE

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.010"	
RISER	2" PVC	5'
GRADED SAND		275#
BENTONITE PELLETS		25#
BENTONITE GROUT		40#

SITE NAME: PLAINFIELD TOWN GARAGE
LOCATION: PLAINFIELD, VT
JOB NO. VT990036
DATE: 9-2-99 (11:15)

BORING NO: MW-3
TOTAL DEPTH: 15'4"
DEPTH TO WATER: ~10'

DRILLING METHOD: HSA
FIELD SUPERVISOR: M. LAURENT
BORING DIAMETER: 4 1/4" HSA
CONTRACTOR: M:W SOILS ENG. CHARLESTOWN, NH
DRILLERS:



CAMERON RD Boring/Well Location

Depth (ft)	Sample No.	BLOW COUNTS PER 6" 0-6	6-12	12-18	18-24	Rec. (ft)	SAMPLE DESCRIPTION	STRATA	WELL DETAIL	PID (ppm)
							MED. DENSE - BROWN FINE GRAVEL	2'		
5'	SS 1	3	3	3	7	19"	MED. DENSE - GREY GRAVELLY SILTS & SANDS W/ ROOTS (FILL)	8'		0.0
10'	SS 2	11	21	23	14/3"	15"	DENSE - GREY GRAVELLY SILTS & SANDS	15'8"		0.0
15'							NO BEDROCK TO DEPTH			
							SET 2" WELL @ 15'4"			
20'							TOP OF WELL @ 5'4			
							SAND TO 4'1"			
							BENTONITE TO 3'			
25'										

AND	33-50%
SOME	20-33%
LITTLE	10-20%
TRACE	0-10%

BLOW COUNT	
0 - 4	VERY LOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
> 50	VERY DENSE

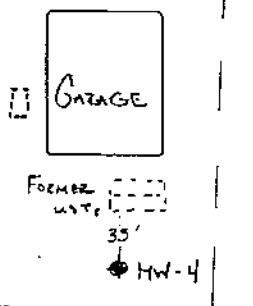
MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.010"	
RISER	2" PVC	5'
GRADED SAND		275#
BENTONITE PELLETS		25#
BENTONITE GROUT		40#

SITE NAME: PLAINFIELD TOWN GARAGE
LOCATION: PLAINFIELD, VT
JOB NO. VT 990036
DATE: 9-2-99 (930)

BORING NO: MW-4
TOTAL DEPTH: 18'
DEPTH TO WATER: ~10'

DRILLING METHOD: HSA
BORING DIAMETER: 4 1/4" HSA

FIELD SUPERVISOR: M. LAMZEDT
CONTRACTOR: M:W SOILS ENGINEERING, CHARLESTOWN, NH
DRILLERS:



Depth (ft)	Sample No.	BLOW COUNTS PER 6" 0-6	6-12	12-18	18-24	Rec. (ft)	SAMPLE DESCRIPTION	STRATA	WELL DETAIL	PID (ppm)
5'	SS 1	4	4	4	3	17"	MED. DENSE BROWN GRAVELLY FILL W/ WOOD CHIPS & DEBRIS			0.0
							OLD GROUND	6'9"		
							LOOSE - LAYER TOPSOIL W/ TRACE ORGANICS	7'1"		
10'	SS 2	3	9	12	29	18"	MED DENSE - OLIVE BROWN GRAVELLY SILTS & SANDS	13'		0.0
15'	SS 3	39	70			12"	VERY DENSE - GREY GRAVELLY SILTS & SANDS	18'		0.0
20'							NO BEDROCK TO DEPTH			
							SET 2" WELL @ 15'6"			
							TOP OF WELL @ 5'6"			
							SAND TO 4'			
							BENTONITE TO 3'			
25'										

AND	33-50%
SOME	20-33%
LITTLE	10-20%
TRACE	0-10%

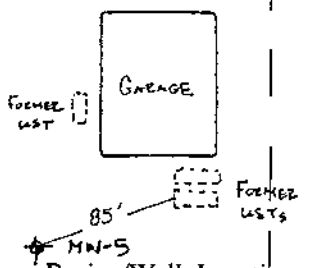
BLOW COUNT	
0 - 4	VERY LOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
> 50	VERY DENSE

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.010"	
RISER	2" PVC	5'
GRADED SAND		275#
BENTONITE PELLETS		25 #
BENTONITE GROUT		40 #

SITE NAME: Plainfield Town Garage
LOCATION: Plainfield, VT
JOB NO. VT 9900 3.2
DATE: 9-2-99 (8:00 AM)

BORING NO: MW-5
TOTAL DEPTH: 15'6"
DEPTH TO WATER: ~10'

DRILLING METHOD: HSA
BORING DIAMETER: 4 1/4" HSA
FIELD SUPERVISOR: M. Laurgot
CONTRACTOR: M; W Soils Engineering, Charlestown, NH
DRILLERS:



Depth (ft)	Sample No.	BLOW COUNTS PER 6" 0-6	6-12	12-18	18-24	Rec. (ft)	SAMPLE DESCRIPTION	STRATA	WELL DETAIL	PID (ppm)
							Med. Dense - Brown Fine Gravels	3'		
5'	SS 1	2	2	8	9	13"	Loose - Med Dense - Wet Brown Gravelly Fine Sands - Trace of Silt	9'+/-		0.0
10'	SS 2	8	39	28	32	15"	Very Dense - Grey Gravelly Silts & Sands	15'6"		0.0
15'							No Bedrock to Depth			
20'							Set 2" Well @ 15'6" Top of Well @ 5'6" Sand to 4'1" Bentonite to 3'2"			
25'										

		BLOW COUNT		MATERIALS USED	SIZE/TYPE	QUANTITY
		0 - 4	VERY LOSE	WELL SCREEN	2" PVC	10'
AND	33-50%	4 - 10	LOOSE	SLOT SIZE	0.010"	
SOME	20-33%	10 - 30	MEDIUM	RISER	2" PVC	5'
LITTLE	10-20%	30 - 50	DENSE	GRADED SAND		27.5#
TRACE	0-10%	> 50	VERY DENSE	BENTONITE PELLETS		25 #
				BENTONITE GROUT		40 #

APPENDIX C

Laboratory Report Forms

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Marin Environmental
PROJECT NAME: Plainfield Town Garage
REPORT DATE: October 18, 1999
DATE SAMPLED: October 7, 1999

ORDER ID: 4384
REF.#: 145,428 - 145,434

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

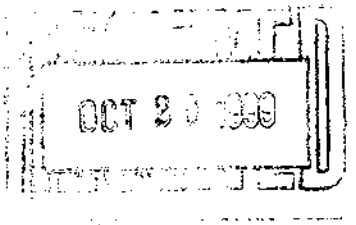
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Marin Environmental
PROJECT NAME: Plainfield Town Garage
CLIENT PROJ. #: NI

DATE RECEIVED: October 8, 1999
REPORT DATE: October 18, 1999
ORDER ID: 4384

Ref. #:	145,428	145,429	145,430	145,431	145,432
Site:	MW-1	MW-2	MW-3	MW-4	MW-5
Date Sampled:	10/7/99	10/7/99	10/7/99	10/7/99	10/7/99
Time Sampled:	1:30	1:15	1:00	12:45	12:30
Sampler:	M.L.	M.L.	M.L.	M.L.	M.L.
Date Analyzed:	10/18/99	10/16/99	10/16/99	10/16/99	10/18/99
UIP Count:	>10	0	0	6	0
Dil. Factor (%):	100	100	100	100	100
Surr % Rec. (%):	101	106	98	91	97
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)
MTBE	5.1	<1	<1	2.4	1.5
Benzene	2.7	<1	<1	<1	<1
Toluene	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1	<1
Xylenes	TBQ <1	<1	<1	<1	<1
1,3,5 Trimethyl Benzene	TBQ <1	<1	<1	<1	<1
1,2,4 Trimethyl Benzene	1.9	<1	<1	<1	<1
Naphthalene	3.4	<1	<1	<1	<1

Ref. #:	145,433	145,434			
Site:	Duplicate	Blank			
Date Sampled:	10/7/99	10/7/99			
Time Sampled:	1:30	1:45			
Sampler:	M.L.	M.L.			
Date Analyzed:	10/18/99	10/16/99			
UIP Count:	>10	0			
Dil. Factor (%):	100	100			
Surr % Rec. (%):	101	91			
Parameter	Conc. (ug/L)	Conc. (ug/L)			
MTBE	5.4	<1			
Benzene	2.6	<1			
Toluene	<1	<1			
Ethylbenzene	<1	<1			
Xylenes	TBQ <1	<1			
1,3,5 Trimethyl Benzene	TBQ <1	<1			
1,2,4 Trimethyl Benzene	1.8	<1			
Naphthalene	2.5	<1			

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

CLIENT: Marin Environmental
PROJECT: Plainfield Town Garage
REPORT DATE: October 21, 1999

ORDER ID: 4384
DATE RECEIVED: October 8, 1999

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

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ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

CLIENT: Marin Environmental
PROJECT: Plainfield Town Garage
REPORT DATE: October 21, 1999

ORDER ID: 4384
DATE RECEIVED: October 8, 1999
SAMPLER: ML
ANALYST: 128

Ref. Number: 145428 | Site: MW-1 | Date Sampled: October 7, 1999 | Time: 1:30 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	1.6	mg/L	SW 8015B	10/16/99

Ref. Number: 145429 | Site: MW-2 | Date Sampled: October 7, 1999 | Time: 1:15 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 0.40	mg/L	SW 8015B	10/16/99

Ref. Number: 145430 | Site: MW-3 | Date Sampled: October 7, 1999 | Time: 1:00 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 0.40	mg/L	SW 8015B	10/16/99

Ref. Number: 145431 | Site: MW-4 | Date Sampled: October 7, 1999 | Time: 12:45 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 0.40	mg/L	SW 8015B	10/16/99

Ref. Number: 145432 | Site: MW-5 | Date Sampled: October 7, 1999 | Time: 12:30 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 0.40	mg/L	SW 8015B	10/16/99

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4332

CHAIN-OF-CUSTODY RECORD

2-09 33113

Project Name: PLAINFIELD TOWN GARAGE Site Location: PLAINFIELD, VT	Reporting Address: MARIN ENV 1700 HERMAN AVE COLCHESTER, VT 05446	Billing Address: MARIN
Endyne Project Number: 4384	Company: MARIN Contact Name/Phone #: M LAURENT / 655-001	Sampler Name: ML Phone #:

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
145428	MW-1	H_2O			10-7 / 1330	3	40 ML	Source Well	8021 B/TPH	HCl	
145429	MW-2	↓			1315	3	↓		↓	↓	
145430	MW-3				1300	3					
145431	MW-4				1245	3					
145432	MW-5				1230	3			↓		
145433	DUPLICATE				1330	2			8021 B		
145434	BLANK	↓			↓ 1345	2	↓		8021 B	↓	

Relinquished by: Signature	Received by: Signature	Date/Time 10-8-99 11:15am
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ____ No ____

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										